Replaced by art. 34

CLAIMS

1 A device for integrating electrodes (12) for characterizing the flow of a multiphase fluid into a tubing (10) through which the fluid flows, the device being characterized in that it comprises a tube section (14) made out of an electrically insulating material and having an internal diameter substantially equal to that of the tubing (10), said tube section (14) being integrated into the tubing and bearing the electrodes (12) on its external surface.

2 A device as claimed in claim 1, further comprising a flexible compensation sheath (16) that encircles the tube section (14) bearing the electrodes (12), the sheath delimiting, with the tube section, a first closed annular space (22) which filled with an insulating and incompressible fluid, and with a portion of the tubing (10) encircling the sheath, a second annular space (18) which communicates with the fluid flowing in the tubing.

3 A device as claimed in claim 2, wherein seal rings (29) are secured on the ends of the tube section (14) bearing the electrodes (12).

4 A device as claimed in claim 3, wherein the flexible compensation sheath (16) is an elastic membrane, the ends of which are directly or indirectly secured on the seal rings (29).

5 A device as claimed in claim 3 or 4, wherein the seal rings (29) are secured on the ends of the tube section (14) bearing the electrodes (12) by means of interference or shrink fit, brazing, molding, O-rings, or bonding.

6 A device as claimed in any of claims 3 to 5, wherein the tube section (14) bearing the electrodes (12) forms, with the compensation sheath and the seal rings (29), a sensor assembly (27) which is mounted within a junction area between two sections (10a, 10b) of the tubing (10).

7 A device as claimed in claim 6, wherein the sensor assembly (27) is flexibly mounted

within the junction area, with interposition of elastic mountings (28).

8 A device as claimed in claim 6 or 7, wherein the junction (30) between the two sections (10a, 10b) of the tubing is threaded or welded.

9 A device as claimed in any preceding claim, further comprising a mixing system (32) placed in the tubing (10), upstream from the tube section (14).

10 A device as claimed in claim 9, wherein the mixing system is a Venturi (32) with an internal diameter d such as $0.316<\beta<0.7751$, with $\beta=d/D$, D being the internal diameter of the tubing (10), and the distance between the outlet end of the Venturi (32) and inlet end of the tube section (14) bearing the sensors (12) is between 1 and 10 times the internal diameter of the tube.

11 A device as claimed in any of the preceding claims, wherein the tube section (14) made out of an electrically insulating plastic, rubber derivative, polymer or ceramic material.